the U. S. National Herbarium (Vol. 13, pt. 2) illustrating the paper by five fine photographs.

Professor Aven Nelson's "Contributions from the Rocky Mountain Herbarium," VIII. (*Bot. Gaz.*, XLVII.), includes many new species from the deserts of southern Nevada and adjacent Arizona, collected by L. N. Goodding in 1905.

Dr. E. L. Greene has taken time enough from his historical studies to bring out a number of descriptive or critical papers, among which are "New Californian Asteraceae," "Some Western Caulescent Violets," "Two New Southern Violets," etc., in his Leaflets of Botanical Observation and Criticism (Vol. II.); and "Some Thalictra from North Dakota" in the *Midland Naturalist* (October, 1909). Three new species are described.

Professor W. L. Jepson's "Synopsis of the North American Godetias" (University of California Publications, Vol. 2, No. 16) is a careful and exhaustive study of the species of this Pacific coast genus. Seventeen species are recognized, of which six are new. A helpful plate accompanies the paper.

Another paper on cactuses—"Cactaceae of Northeastern and Central Mexico," by W. E. Safford (Smithsonian Report for 1908), adds materially to our knowledge of these interesting plants. The first twenty pages are devoted to a general discussion of the structure, morphology and classification of the cactuses at large, while the remaining eighteen pages are given to a synopsis of Mexican Cactaceae. Fifteen fine plates and twenty-four text figures make this a valuable paper for any one who wishes to learn about the Cactaceae.

Here we may briefly mention Professor Schaffner's "Pteridophytes of Ohio," which is in reality an excellent local manual of these plants; Professor Shimek's "Flora of Winneshiek County" (Iowa), being a useful annotated list, with ecological discussions; Professor L. H. Harvey's "Floristic Composition of the Vascular Flora of Mount Ktaadn, Maine," with analytic tables and discussions; and lastly Professor Ruth Marshall's "Vegetation of Twin Island" giving the results of several summers' studies of a small island in Lake Spooner in northwestern Wisconsin. It contains a suggestion as to what may be accomplished scientifically while having a good outing.

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Special Articles

The Sex-Determining Chromosomes in Ascaris

In 1908 Professor Boveri observed in an especially large number of the fertilized eggs of *Ascaris megalocephala bivalens*, a small chromatin element which he had already previously seen, and thinking that it might be a sex chromosome, he suggested to Miss Boring that she should make an exact study of the chromatin conditions in this species. Though Miss Boring obtained important results,[1] she could not arrive at any positive conclusion concerning the significance of this element. In an appendix to Miss Boring's paper (*l. c.*), Professor Boveri concludes that this small chromosome in *Ascaris megalocephala* is a sex-determinant, and also reports the finding by himself and Gulick, of a heterochromosome in *Heterakis*, which behaves exactly like the heterochromosome in some hemiptera (type *Protenor*, of Wilson).

Following the suggestion of Professor Boveri, I have worked upon the spermatogenesis of *Ascaris megalocephala* and *Ascaris lumbricoides*. In the maturation divisions of the spermatogenesis of *Ascaris megalocephala*, which have been very accurately investigated by O. Hertwig and Braur, and also by Miss Boring, nothing has been observed hitherto of an independent chromatin element that could be interpreted as a heterochromosome. Boveri (*l. c.*) has offered as an explanation for this condition, that the heterochromosome here may be united with one of the large chromosomes. Studying a great number of males of *Ascaris megalocephala*, I have found one in which an independent heterochromosome can be followed throughout the whole maturation period and another in which it is present in

[1] *Archiv f. Zellforschung*, V. 4.

the primary spermatocytes. The heterochromosome in the vesicular nucleus of the primary spermatocytes is a small element composed of two halves lying to one side of the two tetrads. In the first maturation division the two halves of the heterochromosome are distributed to the two daughter cells and in the second maturation division, the now simple heterochromosome passes over undivided to one spermatid. So one half of the spermatozoa contain the well-known two rod-formed elements, while the remaining spermatozoa possess in addition to the two large chromosomes, the small heterochromosome. There can be scarcely any doubt that this element is identical with the "small chromosome" described by Miss Boring for a part of the fertilized eggs.

In *Ascaris lumbricoides* I have found the sex-determinant in the form of a group of five univalent chromosomes passing undivided to one daughter cell in the first maturation division so that one half of the secondary spermatocytes, and consequently one half of the spermatozoa, have 19, the other half, 24, chromosomes. This type has some similarity with that of *Gelastocoris* described by Payne,[2] but differs from it in this respect that in *Ascaris lumbricoides* all five constituents of the group go to one daughter-cell.

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THE AMERICAN FEDERATION OF THE TEACHERS OF THE MATHEMATICAL AND NATURAL SCIENCES

THE annual meeting of the council of the American Federation was held on Monday, December 27, 1909, at the Massachusetts Institute of Technology in Boston, Mass. There were twenty-two representatives of eight associations present. The report of the executive committee showed that six associations had joined the federation during the past year. The total number of paid-up members in the associations that belong to the federation now amounts to 2,040.

Reports were presented from the local associations showing activity and progressive work in all.

The committee on bibliography of science teaching reported that its work was completed and urged the federation to get the bibliography printed as soon as possible.

The committee on a syllabus in geometry reported that work was well under way. The committee has been divided into three sub-committees, one on logical considerations, one on lists of basal theorems and one on exercises and applications. The committee expects to have its work completed during the coming year.

The committee on college entrance requirements had gathered a large amount of information which showed the great variation in the requirements of the different colleges and showed that it was impossible for any school to meet them all. The committee recommended that the federation take up this matter with the College Entrance Examination Board and see what can be done toward bringing about uniformity. The report was accepted as a report of progress and the committee continued and urged to carry on the work.

The committee on publication recommended that the federation publish its reports in *School Science and Mathematics* and such other journals as would accept them and urged that the local associations send their reports of their meetings to *School Science and Mathematics* promptly and regularly. The report was accepted as a report of progress and the committee continued.

The New England Association of Chemistry Teachers presented a request that the federation appoint a committee to make suggestions for changes in the definition of the requirement in chemistry and that the federation should bring this matter to the attention of the College Entrance Examination Board. The request was approved.

A letter from the College Entrance Examination Board asked cooperation of the federation in determining what form of logarithm tables were best to study for examination purposes. It was voted that a committee be appointed by the chair in accordance with the wishes of the college board.

The question of the publication of a journal for mathematics alone was discussed at some length and it was voted that a committee be appointed to consider this question and report at the next meeting.

Informal reports of progress were presented by members of the International Commission on Teaching of Mathematics.

The nominating committee reported nominations

[2] *Biol. Bull.*, V. 14, 1908.